



HAWAII COOPERATIVE EXTENSION SERVICE

College of Tropical Agriculture and Human Resources

University of Hawaii

GENERAL HOME GARDEN SERIES No. 37

FERTILIZERS FOR FRUIT TREES IN THE HOME GARDEN

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Fertilizers are used to supplement the soil's supply of nutrients for plants. For the most efficient use of applied fertilizers, the pH of the soil should be in the proper range for the crop,¹ there should be adequate organic matter and moisture and good aeration, and the soil should have good tilth.²

What to Apply

Fertilizers and soil amendments should be applied to meet the needs of the particular fruit tree. The amount of fertilizer needed should be determined by a soil test. For home gardens it is usually satisfactory to use the "standard" rate and analysis of fertilizer for each type of fruit. However, an observant gardener can often tell, by observing color, growth, and vigor, if a plant is receiving enough fertilizer.

Banana

For banana apply $\frac{1}{2}$ lb treble superphosphate (T.S.P. or 0-46-0)³ in each hole at planting time. Mix the fertilizer with soil in the hole before planting.

After the plant is established, fertilize with a 2-1-4 or 3-1-5 ratio of nitrogen, available phosphoric acid, and water-soluble potash, such as 10-5-20 or 15-5-25, every four months. Apply 1 to 2 lb per plant until about nine months old; then apply 3 to 4 lb per mat every three to four months. On soils with low pH (below pH 6.0), field experience has shown that lime should be applied at a rate of up to 3 to 4 lb crushed coral (agricultural lime) or dolomite per mat every four months.

¹See General Home Garden Series No. 18, "The pH Preference of Plants."

²See General Home Garden Series No. 22, "Use of Soil Amendments to Improve Physical Properties of Soil."

³See General Home Garden Series Nos. 12, 13, 14, and 15, "Composition of Fertilizer Materials."

Papaya

For papaya apply $\frac{1}{4}$ to $\frac{1}{2}$ lb treble superphosphate per plant in each hole or hill before planting or transplanting; mix the fertilizer thoroughly with the soil before planting.

After the plant is established, apply a 1-1-1 ratio, such as 15-15-15, 20-20-20, 15-8-10, or similar analysis. The fertilizer should be reapplied every 28 to 30 days. During the first three months apply $\frac{1}{4}$ lb per plant per month. During the next three months apply $\frac{1}{2}$ lb per plant per month and then 1 lb per tree per month as long as harvesting continues.

Woody Trees

The woody trees, such as avocado, citrus, lychee, and mango, should receive 1 to $1\frac{1}{2}$ lb treble superphosphate, mixed with the soil in the hole at the time of planting.

After the trees are established, they should be fertilized with 1 lb of fertilizer each year for each diameter inch of the tree trunk at breast height (approximately $4\frac{1}{2}$ to 5 ft). This fertilizer should be applied just before each flush of growth. For young trees, apply 1 to 2 lb per tree per year. This amount, calculated, should be divided into two to four applications per year. One application should be made after the crop is harvested. A small application should be made at the end of flowering and when fruits are just beginning to develop (caution should be used with this application; excessive use of nitrogen at this stage may result in premature fruit drop). The rest of the fertilizer may be applied after heavy or prolonged rains when nutrients in the soil may have been leached away. In most soils the application of 10-30-10, 10-20-10, 10-5-20, 10-5-8, or similar analysis of fertilizer is satisfactory.

How to Apply Fertilizers

The best method for tree crops is to apply the fertilizer in an area beginning 6 inches from the base of the plant and extending out to the leaf-drip line, or the outer edge of the plant. Place the fertilizer in a series of holes varying in depth from 6 inches to 18 inches, placed at random locations within the above area. Holes may be made with a soil sampling tube, pipe, or similar tool. Each hole should receive an equal amount of the fertilizer to be applied. After placing the fertilizer in the hole, cover each hole by filling with soil or stepping on the soil with the heel to close the hole. Applying the fertilizer in this manner places it within the root zone of the plant, with minimum damage to the roots. This helps stimulate deep root growth in the soil and reduces moisture stress in times of drought; it also reduces damage from fertilizer burn and excessive loss of fertilizers due to erosion and leaching. The tree will be more firmly rooted in the soil and less likely to suffer wind damage.

The fertilizer also may be placed in a trench just within or without the leaf-drip line. The trench should be 6 to 12 inches deep. The trench method is less effective than placing the holes at random. It also results in more root damage because roots that extend into the trench area may be cut. Because root damage encourages phytophthora infection, this method may not be satisfactory for avocado. The trench method uses less labor, however, and also encourages deeper root systems.

Another method of application is to broadcast the fertilizer in a zone 6 inches from the base of the plant to the leaf-drip line. This method is easier and

requires the least labor, but is the least effective. The fertilizer effect is diluted because it covers a greater area of soil. Plant roots tend to develop at the surface or just below the surface, making them more susceptible to moisture stress and fertilizer burn and more in need of frequent irrigation to maintain plant growth. Furthermore, a plant whose roots are at the soil surface is more easily blown over. Broadcast fertilizers should be watered in to promote more efficient use of the fertilizer and reduce the danger of burning.

Fertilizers also may be applied in the irrigation water (fertigation). Use only soluble materials compatible with each other; flush the irrigation lines to remove all fertilizer residue to prevent damage to the lines and incorrect amounts of fertilizer at the next application. Make sure no residues remain on the plant, as they may damage plant tissue.

The fertilizer also may be applied as a dilute spray (foliar application) to the leaves of the plants.⁴ All plant nutrients may be absorbed through the leaves. The amounts of nitrogen, phosphorus, and potassium needed by plants are so great, however, that leaf feeding is not considered an economical means of applying these nutrients. This is true also of calcium, magnesium, and sulfur. The micronutrients (iron, zinc, copper, manganese, boron, and molybdenum) may be applied economically and effectively as sprays. Use only soluble materials according to directions. Leaves are easily burned if the spray solution contains too much fertilizer.

⁴See General Home Garden Series No. 24, "Foliar Application of Fertilizers."